Garrett James Blair

PhD candidate in Behavioral Neuroscience, Psychology Department
University of California, Los Angeles

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Education

Graduate: University of California, Los Angeles (September 2015 – current)
M.A. in Psychology (March 2017)
Advanced to candidacy (June 2019)
PhD in Psychology, in Behavioral Neuroscience with a minor in Learning and Behavior (in progress)

UC GPA: 3.662 *Units taken:* 183

Undergraduate: University of California, Irvine (September 2011 – June 2015)
B.S. in Cognitive Science, emphasis in Cognitive Neuroscience, (Magna Cum Laude)
B.A. in Spanish, emphasis in Literature and Culture, B.A. (Cum Laude)
UC GPA: 3.827 *Units taken:* 236

Current Research

University of California, Los Angeles (July 2015 - current)

PhD advisor: Hugh T. Blair (no relation)

Research focus: Hippocampal remapping during aversive learning

Methods: (Rats) In-vivo single-photon calcium imaging and electrophysiology.

For my doctoral research, I have been working with Dr. Hugh T. Blair researching place cells in the hippocampus, primarily focused on how aversive learning affects contextual representations within the hippocampal CA1 field. I have applied the UCLA miniscopes for usage in rats recording from populations of CA1 place cells over weeks. I have also developed multiple methods for combining calcium imaging alongside electrophysiology using either tetrodes or silicon probes. Recently, I have also assisted in the development and prototyping of the next generation of large wide-field of view miniscopes.

Previous Research

University of California, Irvine (June 2013 – June 2015)
Research in Chubb-Wright Lab, human visual psychophysics research; senior honors thesis studied if an object's size can be used as a pre-attentive visual filtering mechanism.

University of California, Irvine (January 2014 – September 2014)
Research with Professor D'Zmura, brain-computer interface using EEG studying the effects of virtual reality immersion during self-motion vestibular mismatch.

Awards and Honors

Academic and Professional Honors

2011-2015	University of California, Irvine Dean's Honor List
2011-2015	University of California, Irvine Campuswide Honors Program
2015	Undergraduate Research Opportunities Program fellowship
2015	Cognitive Science (BS) Magna Cum Laude
2015	Spanish Literature and Culture (BA) Cum Laude
2015	UCLA Alumni Fellowship
2016	UCLA Graduate Research Summer Mentorship award
2016	UCLA-PKU Joint Research Inst. Award
2016	UCLA Brain Research Inst. Grad. Student Travel Award

Memberships and Professional Activities
Vision Science Society (2015)
Society for Neuroscience (2016-current)

Publications

G.J. Blair[*], C. Guo, D.B. Aharoni, H.T. Blair. *Effect of aversive conditioning on place cell ensemble activity*. (in prep)

C. Guo, **G.J. Blair**[*], H.T. Blair, D.B. Aharoni. *The next generation of miniature endoscopes.* (in prep)

G.J. Blair[*], E.E. Hart[*], T.J. O'Dell, H.T. Blair, A. Izquierdo. *Chemogenetic modulation and single-photon calcium imaging in anterior cingulate cortex reveal a mechanism for effort-based decisions*. Journal of Neuroscience, 15 July 2020, 40 (29) 5628-5643; DOI: https://doi.org/10.1523/JNEUROSCI.2548-19.2020

P.J. Schuette, F.M.C.V. Reis, S.M. Pereira, M.H. Chakerian, A. Torossian, **G.J. Blair**, W. Wang, H.T. Blair, J.C. Kao, A. Adhikari. *Long-term characterization of hippocampal remapping during contextual fear acquisition and extinction*. Journal of Neuroscience, 21 October 2020, 40 (43) 8329-8342; DOI: https://doi.org/10.1523/JNEUROSCI.1022-20.2020

Z. Chen, **G.J. Blair**, H.T. Blair, J. Cong. *CANSEE: Customized Accelerator for Neural Signal Enhancement and Extraction from the Calcium Image in Real Time*. FPGA 2020: 318; DOI: https://doi.org/10.1145/3373087.3375358

Z. Chen, **G.J. Blair**, H.T. Blair, J. Cong. *BLINK: bit-sparse LSTM inference kernel enabling efficient calcium trace extraction for neurofeedback devices*. ISLPED 2020: 217-222; DOI: https://doi.org/10.1145/3370748.3406552

[*]co-first author

Presentations

Z. Chen[*], **G. J. Blair**, H. T. Blair, and J. Cong. *BLINK: Bit-Sparse LSTM Inference Kernel Enabling Efficient Calcium Trace Extraction for Neurofeedback Devices*. International Symposium on Low Power Electronics and Design (ISLPED). 2020, Boston, USA. Aug. 10th. [**Poster & Abstract in Proceedings**]

Z. Chen[*], **G. J. Blair**, D. Aharoni, P. Golshani, J. Cong, and H. T. Blair. *Calcium Image Processing for Energy-Efficient Closed-Loop Neurofeedback in Sub-ms Latency*. 6th Annual BRAIN Initiative Investigators Meeting, 2020, Jun. 1st **[Poster]**

Z. Chen[*], **G. J. Blair**, H. T. Blair, and J. Cong. *Acceleration of Calcium Imaging Processing Pipeline for the UCLA Miniscope Project*. CDSC/InTrans Review. 2020, UCLA. Feb. 27th **[Poster]**

Z. Chen[*], **G. J. Blair**, R. Seow, H. T. Blair, and J. Cong. *CANSEE: Customized Accelerator for Neural Signal Enhancement and Extraction from the Calcium Image in Real Time*. International Symposium on Field-Programmable Gate Arrays (FPGA), 2020, Seaside, USA. Feb. 23rd **[Poster & Abstract in Proceedings]**

Blair, GJ[*] *Utilizing the next generation of miniature endoscopes to probe hippocampal function*. Knierim Lab, John's Hopkins University, 2019, Baltimore, USA. Nov. 6th **[Talk]**

Z. Chen[*], **G. J. Blair**, D. Aharoni, P. Golshani, J. Cong, and H. T. Blair. *FPGA-Based Real-Time Processing of Integrated Electrophysiology and Calcium Imaging with the UCLA Miniscope*. Neuroscience 2019 Annual Meeting. Chicago, USA. Oct. 19th. **[Poster]**

Blair, GJ[*], Howe, AG, Golshani, P, & Blair, HT (2018) *Long-term population recordings of hippocampal place cells via Ca2+ imaging in the rat*. UCI Learning and Memory 2018 conference. **[Poster]**

Hart, EE[*], **Blair, GJ**, Blair, HT, Izquierdo, A (2018) *Mediation of Effort-Based Choice and Miniaturized Fluorescence Microscopy Calcium Imaging in Rat Anterior Cingulate Cortex*. Neuroscience 2018 Annual Meeting. **[Poster]**

Blair, GJ[*], Howe, AG, Aharoni, D, Flores, S, Shuman, T, Golshani, P, & Blair, HT (2016) *Calcium Imaging of Hippocampal Cell Activity in Behaving Rats*. Neuroscience 2016 Annual Meeting. **[Poster]**

Howe AG[*], DeGuzman RM, **Blair GJ**, Blair HT (2016) *Place Cells in the Septohippocampal Nucleus of Freely Behaving Rats*. Society for Neuroscience 2016 meeting, San Diego, CA. **[Poster]**

Blair GJ[*], Wright CE, Chubb C, Sun P, Sperling G (2015). *Disc size supports top-down, selective attention in a task requiring integration across multiple targets*. Journal of Vision 15(12):897. **[Poster & Abstract in Proceedings]** DOI:10.1167/15.12.897.

[*]presenting speaker

Research Skills	➢ MATLAB and Python programming, primarily for calcium imaging (motion correction, cell segmentation, cross day matching) and behavioral analysis ➢ Single-cell and population level analysis of spatial tuning, decoding, and event-related responses ➢ Taught multiple labs surgical and analysis techniques involved in calcium imaging (Izquierdo, Adhikari, Kneirim) ➢ Hippocampal calcium imaging, electrophysiology (single-unit and EEG), and inhibitory DREADDs techniques ➢ Perfusion, histology, and imaging procedures ➢ Fluent in Spanish and basic knowledge of French
Academic contributions	**Development of a miniscope teaching module for undergraduates** During Spring quarter of 2019, while I was serving as a teaching assistant for Dr. William Grisham and Dr. Hugh T. Blair, I led the development and implementation of a "miniscope imaging" teaching module. This was a three week course during which students of the Psych 116 behavioral neuroscience course learned how to construct and use miniature endoscopic microscopes ("miniscopes") within an actual experiment that took place in their classroom. This gave approximately 200 students hands-on experience with cutting edge neuroscience research tools developed at UCLA. We also performed analysis of that data with the students to show them how we can leverage these tools to address hypotheses about brain function. Student reviews of the course were overwhelmingly positive: "I very much appreciated having Garrett as a TA for this class. When asked a question, he knew the answer; however he was always able to explain the answer in "plain English" making the information easy to understand. In addition to this, he was very helpful in trouble shooting problems that came up during lab especially with computer software and coding. He always seemed to be a solid go-to for clarification or leading you to the next step. Having him as a TA likely made lab easier than it would have been otherwise."
Courses TA'd	***Behavioral Neuroscience Lab*. Psychology 116** – Spring 2020, Prof. Grisham (50%, 2 three-hour lab sections) ***Behavioral Neuroscience Lab*. Psychology 116** – Spring 2019, Prof. Grisham (50%, 2 three-hour lab sections) ***Behavioral Neuroscience Lab*. Psychology 116** – Fall 2016, Prof. Grisham (50%, 2 three-hour lab sections) ***Behavioral Neuroscience*. Psychology 115** – Fall 2016, Prof. Schein (50%, 4 one-hour discussion sections) ***Research Methods in Psychology*. Psychology 100B** – Winter 2017, Prof. Fristenburg (50% 2 two-hour discussion sections)